An Energy Efficiency Workshop & Exposition

Palm Springs, California

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Turn off all cell phones

and

Set pagers to vibrate

An Energy Efficiency Workshop & Exposition

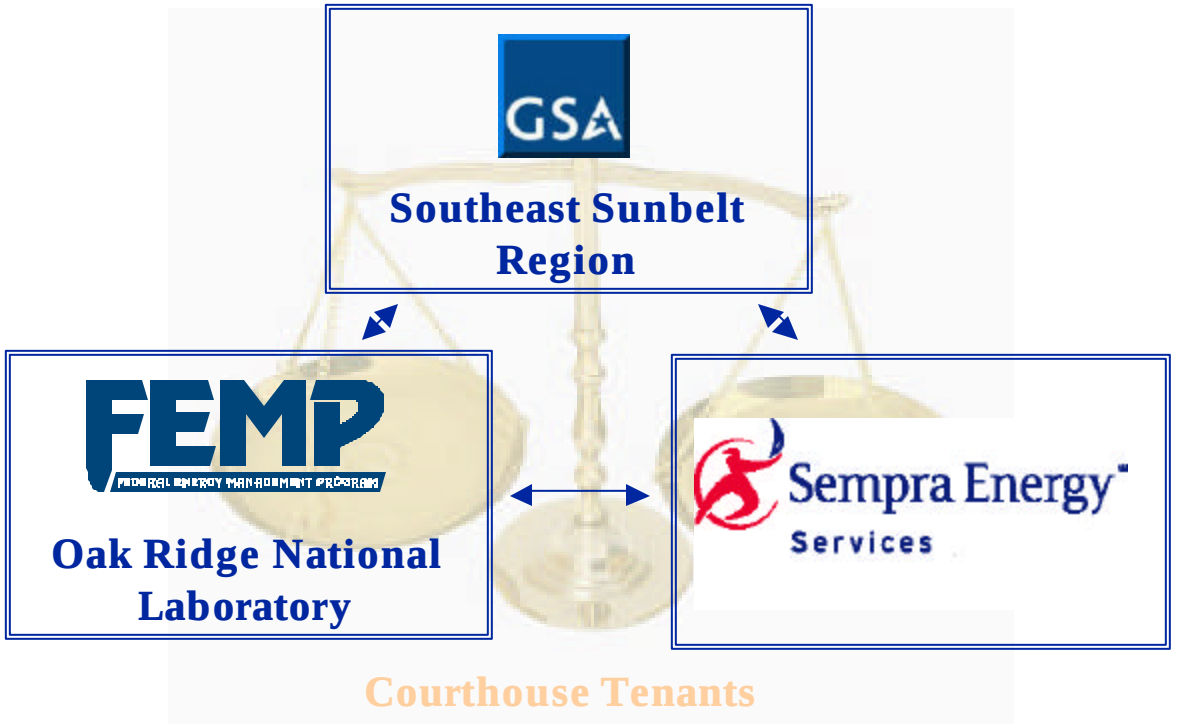
Palm Springs, California

Digging in to New Construction

Gulfport Courthouse

June 5, 2002

Partnership



Intent

Showcase use of Alternative Financing to improve energy efficiency of Federal new construction project

Mission

- Introduce General Concepts re: Energy Savings Performance Contracting application in new construction scenario
- Relate specific concepts applied to Gulfport Courthouse project

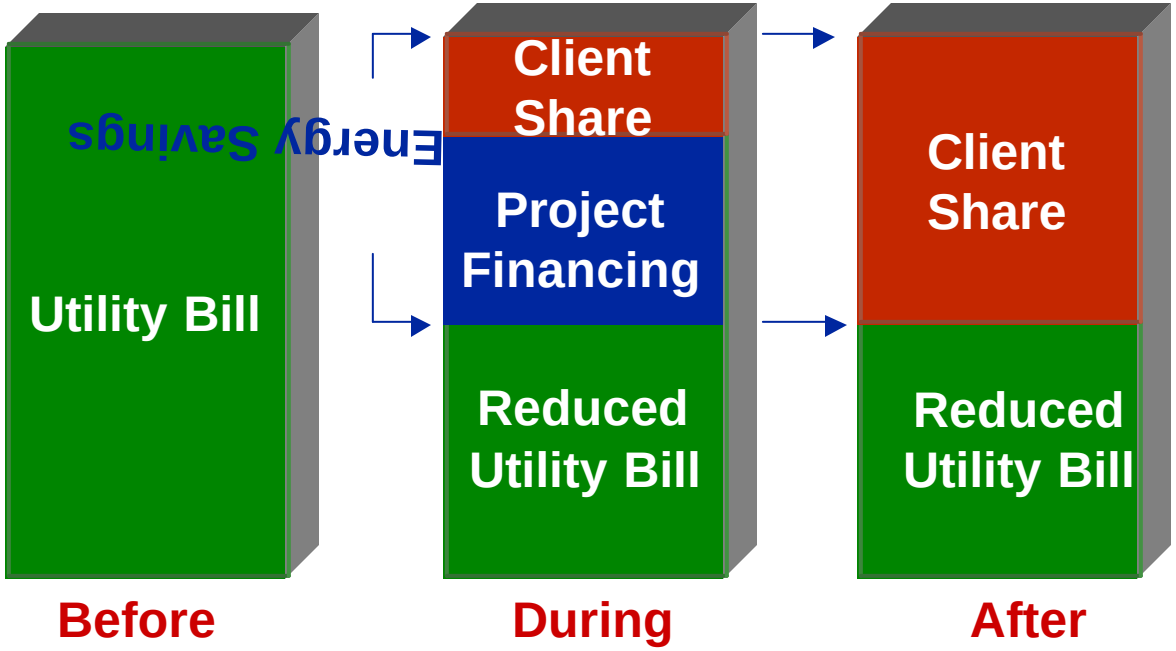
Concepts

The Need

- Capital Budget Challenges
  - Limited Funding
  - Lengthy Approval Process
  - Functional Scope Creep
  - Energy Item Vulnerability
- Enhance Energy Performance of newly constructed buildings

Concepts

Energy Performance Contracting



Concepts

GSA Role

- Deliver Quality project on time, within budget
- Satisfy Customer expectations
- Coordinate myraid contracts and criteria that impact project completion and performance

Concepts
FEMP Role

- Facilitate interaction between GSA & ESCO
- Balance needs of parties (especially in terms of risk)
- Gain concensus on approach (esp. DOE & Agency Contracting Officer buy-in)

Concepts

ESCO Role (possibilities)

- **Financing Agent for ECM Savings**
  - **Install subset of ECMs**
    - **Construct discrete, energy-related Scope of Work**
      - **Subcontractor (Mech, Elec, and/or Cntls) for entire building**
        - **General Contractor for entire building**

Implementation

Concepts

ESCO Role (possibilities)

- **Warranty only**
  - **Operate and/or maintain ECMs installed by ESCO**
    - **Operate and/or maintain all ESPC ECMs**
      - **Full building operation and maintenance**

Operations and Maintenance

Concepts

Savings Identification

- Model baseline condition
- Value engineer design from energy standpoint
- Model energy efficient design

Energy $$_{base}$$ – Energy $$_{eff.}$$ = Level of Alternative Financing Available

Concepts

Baseline Development

- Current design for new building
- ASHRAE 90.1 standards
- Energy performance of current location
- Typical, recent experience of GSA
- Combination of above

Whatever is agreeable; needs to withstand audit!

Concepts

Design Interface

- When is it appropriate to get ESCO involved?
- How do you handle ESCO involvement prior to ESPC Delivery Order award?
- How do ESCO–recommended design changes make their way into final design of building?

Federal Courthouse, Gulfport, MS

Gulfport Courthouse

- New eight-story tower
- Historic preservation / reuse of 1920's – vintage high school
- Stand-alone service building that supports campus (chillers, boilers, emergency generator)
- Approximately 220,000 SF total
- Construction Cost: $ 45 Million

Gulfport Courthouse
Construction Timeline

- General Contractor Selected: Sep 00
- Notice to Proceed to GC: Aug 01
- Scheduled Completion: Aug 03
- Beneficial Occupancy: Oct 03

Gulfport Courthouse
ESPC Development Timeline

- Unofficial Notification of Selection: Feb 00
- Initial Proposal Submitted: Nov 00
- Notice of Intent to Award D.O.: Feb 01
- Final Proposal Submitted: May 01
- Delivery Order Awarded: Sep 01

Gulfport Courthouse
Development Methodology

1) Determine Baseline

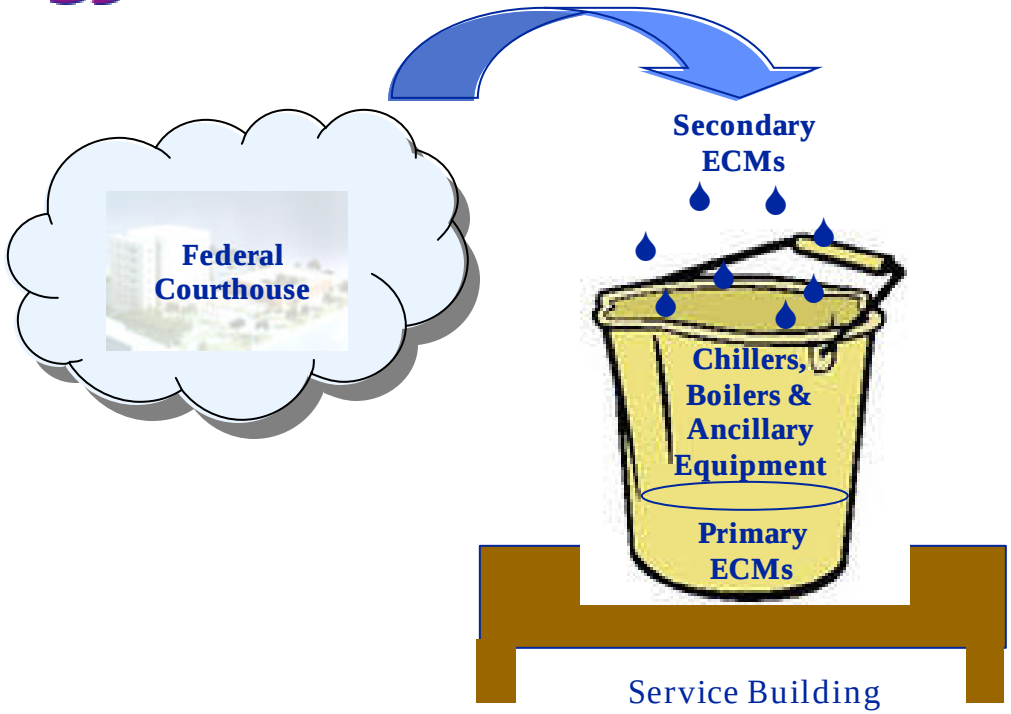
2) Analyze ECMs / Value Engineer

3) Identify incremental costs / savings

4) Aggregate Savings

5) Apply savings to identifiable feature

Gulfport Courthouse
Aggregate Savings



Gulfport Courthouse
ESPC Savings Make-up

- Annual Savings
  - Energy Savings
  - O & M Savings
- One-time Ancillary Cost Savings / Cost Avoidance

Gulfport Courthouse
Energy Savings

Glazing Upgrades	$10.2K
Lighting Upgrades	$16.5K
Lower ChW Coil Static Pressure	$ 8.1K
VFDs on Air Handling Units	$ 8.3K
VFDs on ChW & HW Pumps, CT Fans	**$ 4.9K**
Increased Chiller Eff., Plant D T	**$ 13.9K**
Occupancy Controlled Ventilation	$10.0K
Cooling Tower Water Meter	**$ 5.9K**
Single Electrical Service Meter	$ 5.9K
Total Energy Savings	**$83.7K**

Orange → Primary ECMs ~ Blue → Secondary ECMs

Gulfport Courthouse
Operations & Maintenance

- Full building O & M
  (i.e., not just O & M on ECMs)
- Normal GSA approach: Base + 4 option years
- As originally proposed: 15 years
- As awarded: 17 years

~ $40K annual savings (Year 1) – $88K cost incurred prior to start of performance period

Gulfport Courthouse
One-time Ancillary Savings/Cost Avoidance

- Deleted Secondary ChW & HW Pumps
- Reduced Capacity, Changed to Inclined-tube Boilers
- Reduced Size of Distribution Piping to Buildings
- Electrical & Controls Revised
- Reduced Service Building Footprint

Total: $320K

Gulfport Courthouse
ESPC Financials

- Capital Investment: $1.6 Million

- Annual Energy Savings: $ 84 Thousand
- Annual O & M Savings: $ 40 Thousand
- Cost Avoidance (annualized): $ 37 Thousand

- Amount Financed: $1.9 Million
  (17 years @ 8.4%)

Note: Annual savings figures represent Year 1 values

Gulfport Courthouse
Development Coordination

- Iterative review of potential ECM baseline and savings prior to submission of Initial Proposal
- Bi-weekly conference calls (GSA, DOE/FEMP, Sempra) during preparation of final Proposal
- Preliminary negotiations/general price agreement w/courthouse mechanical & electrical subs after design completion
- Final negotiations on ESPC conducted after those with GC on courthouse construction

Gulfport Courthouse
Measurement & Verification

- Baseline determination
- Define reasonable post-installation configuration
- Identify appropriate Monitoring and Verification (M&V) processes
- Conduct M&V activities after construction
- Provide annual reports and verification results

Gulfport Courthouse
Measurement & Verification

ECMs Description	IPMVP Option	Baseline M&V	Post-Retrofit M&V
Glazing Upgrade	NB-A-01	Single-Pane (laminated), Clear, Uncoated	Agreed-to Baseline & Savings Based on Engineering Calculation & Simulation Results
Lighting Modifications and Fixture Upgrade	NB-C-01	1.4 W / sf for Courthouse	Agreed to Baseline & Savings Based on Engineering Calculation. Reduced after Case Lighting Density of 1.09 W / sf. Verify equipment is properly maintained.
High Efficiency Chiller Plant	NB-C-01	Chillers with 0.68 kW / ton	Continuous Measured Electrical Consumption.
VFDs on AHUs, Secondary Chilled Water and Hot Water Pumps, and Cooling Tower Fans	NB-C-01	Constant Speed Motors with Estimated Baseline kW	

Gulfport Courthouse
Measurement & Verification

ECMs Description	IPMVP Option	Baseline M&V	Post-Retrofit M&V
AHU and Cooling Coil Upgrade	NB-A-01	4.75" Static Pressure at Cooling Coils	Agreed-to Savings Based on Engineering Calculation and Simulation Results
Modified Central Plant Chilled Water (up to 14) and Condenser Water (up to 12) Delta T	NB-A-01	Chilled Water Delta T= 10, Condenser Water Delta T = 10	
Occupancy Controlled Ventilation	NB-A-01	No Occupancy Control Ventilation	
Reduce Cooling Tower Water Consumption	NB-A-01	Constant Volume Bleed off, No Side Filtration, No Waste Water Credit	

Gulfport Courthouse
ESPC Implementation Timeline

- Construction Kick-off Meeting: March 02
- Begin Physical Construction: Apr 02
- Construction of ECMs Complete: Aug 02
- Ability to Deliver Chilled / Hot Water: Sep 02
- Begin Performance Period: Oct 03

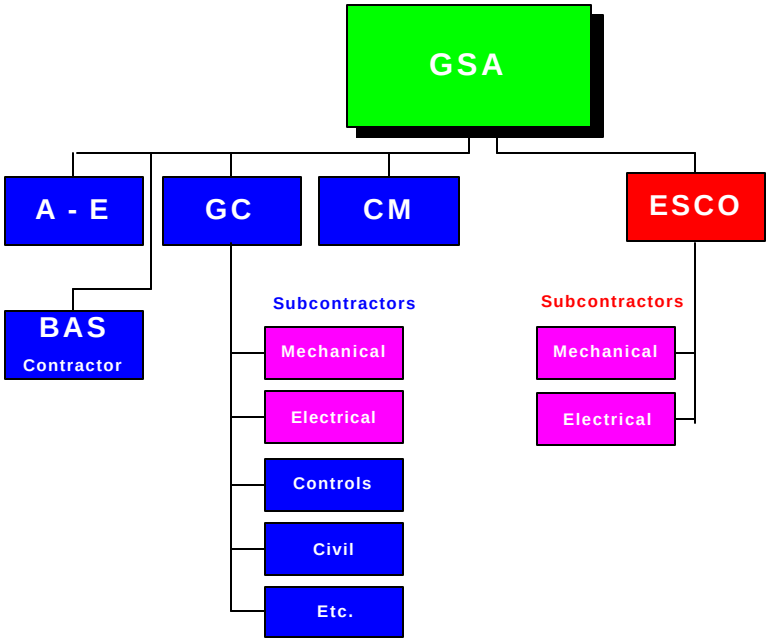
Notes: 1) Construction originally slated to begin Mar 02
2) Equipment procurement took place Oct 01-Apr 02

Gulfport Courthouse
Financing Challenge

- Lock financing at Delivery Order Award (8.4%)
- Reinvest financed amount (2%)
- Commence construction draw 6 months after DO award
- Complete construction draw 12 months after DO award
- Begin receipt of payments from GSA 25 months after DO award

Impact on financing: nearly $300K

Gulfport Courthouse
Contracting Relationship



Gulfport Courthouse
Practical Considerations

- Safety Program
- QA / QC Procedures
- Scheduling
- Site Coordination
- Commissioning

Gulfport Courthouse
Other Considerations

- GC and ESCO selection criteria – Respective strategies for working together?
- Design – When should ESCO get involved? To what extent? Treatment prior to D.O. award?
- Partnering efforts – Integrate ESCO into process during project development?

Cost – Benefit Trade-offs

Gulfport Courthouse
Beyond the Conceptual

Early April 2002

Gulfport Courthouse
Beyond the Conceptual

Late April 2002

Gulfport Courthouse
Benefits

- Reduced first-cost to GSA
- Reduced recurring costs to GSA
- More energy efficient campus
- Fixed accountability for systems performance

Gulfport Courthouse
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